

Report for 2003WY11B: Subsurface Drip Irrigation Systems: Assessment and Development of Best Management Practices

There are no reported publications resulting from this project.

Report Follows

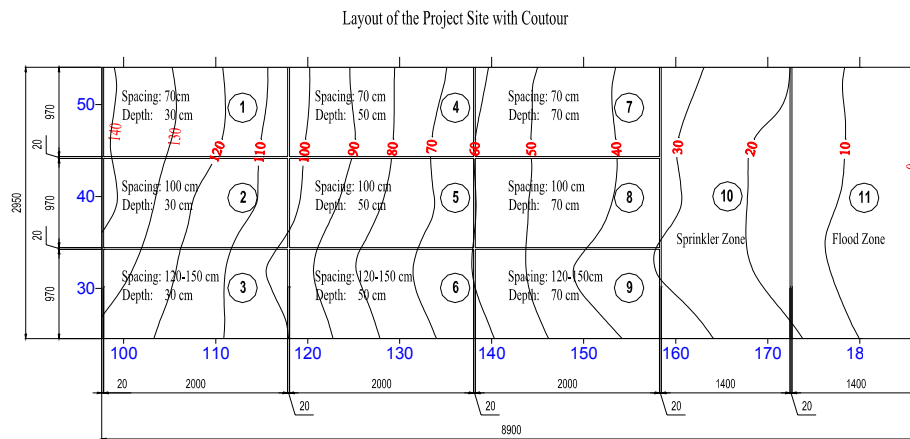
Abstract:

Development of best management practices (BMP) for irrigated agriculture has become essential because efficient use of water is crucial with the ongoing drought in Wyoming and because irrigated agriculture contributes to nonpoint source pollution of our ground and surface waters. Proper management of water and the appropriate application of fertilizers can increase agricultural productivity while minimizing water quality degradation. Microirrigation, such as subsurface drip irrigation (SDI), offers the opportunity for precise application of water and fertilizers. Such irrigation methods are being developed as environmentally-friendly farming practices and systems. In the proposed study, field experiments and computer modeling will be conducted to quantify both water and fertilizers uptake by crops, and the potential of nitrate leaching into ground water in subsurface drip and flood irrigated fields. Detailed field data and comprehensive numerical simulations will help us to understand many theoretical and technical questions in the applications of SDI. The study will provide the necessary information for developing and/or improving irrigation management to enhance crop (e.g. alfalfa) productivity and to minimize ground and surface water contamination.

Current Project Status:

An overview of project goals and procedures was presented to the Midvale Irrigation District Manager and landowners in July 2003. While the landowner originally contacted during proposal preparation opted not to proceed with the study, two other landowners expressed interest in working with us but desired the test site be large (> 40 acres). After obtaining cost estimates from SDI manufactures, it was determined that our initial funding level was inadequate to proceed with the experiment at this larger scale. In attempt to obtain additional funding for a 40 acre test site, a proposal was submitted to the Western States Agriculture Research and Education (WSARE) program. Unfortunately, the proposal was declined funding and we have decided to proceed with the original smaller scale study. The research site was moved to the University of Wyoming's College of Agriculture Research and Extension Center located in Albany County. Employees at the experimental farm assisted with site preparation and will also assist with planting and harvesting. A photograph of the site is provided in Figure 1. A design (e.g. drip emitter depth and spacing, flood and sprinkler zones) has been completed and we are in the final stages of having the system installed. Installation of the drip tape proved to be very labor intensive and we are currently making test runs of the system before alfalfa planting. The system design is also shown Figure 1.

While the project was delayed by moving the test site, overall the project is still on track for both research objectives and training potential. The ongoing drought has caused some difficulties because there is a lack of irrigation water available for the test site. We will be using Laramie City water to supplement our irrigation water supply as needed during this growing season. Measurements are ongoing with this growing season. Two graduate students were supported with project funding this first year. One student assisted with modeling work and the other has focused on experimental design. Three undergraduate were also employed to help with system installation. All these students are receiving training related to water resources through academic course work, research project activities and opportunities to interact with district managers and practitioners.



Note:

(1) Length $L=292.2 \text{ ft}=8900 \text{ cm}$, Width $W=96.0 \text{ ft}=2950 \text{ cm}$, and the total area of the project site: $A=L*W=28051.2 \text{ ft}^2=2627.0 \text{ m}^2$.

(2) Unit of contour and dimension is "cm". The elevation "0" is chosen as the lowest point in the study field.

(3) Vertical direction is S-N, which are the absolute locations of "4572700" + data in Y axis; Horizontal direction is E-W, which are the absolute locations of "446300" + data in X axis.

(4) ① — ⑨ are SDI Zones.

Figure 1 – Photograph of experimental site and site design drawing

Meetings/Presentations:

“Best Management Practices for Subsurface Drip Irrigation” Midvale Irrigation District manager and irrigators. July, 2003

Student Support:

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